

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH

*Dedicated to protecting and improving the health and
environment of the people of Colorado*

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September 23, 1993

Mr. Martin Hestmark
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500, 8WM-C
Denver, Colorado 80202-2405

RE: Technical Memorandum (TM) 12: Exposure Scenarios, OU 5, July 2, 1993

Dear Mr. Hestmark,

The Colorado Department of Health, Hazardous Materials and Waste Management Division (the Division), has reviewed the above referenced document prepared by DOE and prime operating contractor, EG&G. We recommend that approval of this TM be withheld pending resolution of the comments included below and development of the Risk Assessment Template.

The Division has already commented on the Exposure Scenarios TMs for OUs 1, 2, 3, 4, 6, and 7. Many of the comments included in our correspondence on these TMs are also applicable to this TM for OU 5. Rather than include them here again, however, we comment by reference to our previous correspondence on all sections of this TM.

The Division's additional comments to TM 12 are as follows:

1. The Division continues to believe that, within the future onsite residential exposure scenario, children must be considered as a sensitive subpopulation for all pathways.
2. Section 4.5.1: Oxidized forms of plutonium can solubilize to a limited extent and can be absorbed, particularly by the roots of crops (Garland et al., 1981. J. Agricultural Food Chem 29:915-920). The stems and leaves, as well as roots, have been shown to contain concentrations of soluble plutonium (ATSDR Toxicological Profile for plutonium, Dec, 1990). This indicates some mobility of plutonium in plants. To further support this, plutonium concentrations were higher in the foliage biomass than in the fruits of vegetable crops grown at Oak Ridge and higher in grain crops grown at the Savannah River Plant than in control crops (previous ATSDR citation). The ATSDR citation also indicates that rodents absorbed more Pu-238 when it was incorporated into alfalfa grown on soil containing plutonium than when it was administered in the organic form. For these reasons, the Division believes DOE should evaluate root uptake of radionuclides by plants and the potential risks of subsequent ingestion of these plants by humans.
3. Section 5.1.1: The Division will not accept reducing the number of days/year that oral and dermal exposure to soil and inhalation of soil particulates occurs to 290 from 350. This exposure factor should remain 350 days/year. OU 5 is on a south facing slope where snowmelt is much more rapid, and 1" of snow is not likely

to have a great effect on exposure to contaminated soil, given that exposure indoors can take place.

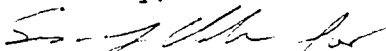
4. Section 5.1.2: The Division agrees that indoor air and outdoor air concentrations of soil particulates should be considered equal. We disagree, however, that the RME for the residential exposure should only consider exposure for 16 hours each day. The reasonable maximally exposed resident is a housewife at home all day and small children pre-school age. This is a 24 hour/day exposure. In addition, the Division does not recognize the "deposition factor."

5. Section 5.1.3: The Division does not agree with time-averaging the child exposure with the adult exposure for soil ingestion. We believe that the child exposure should be calculated separately and added to the adult exposure. In addition, the Division does not agree with a fraction ingested of 0.5. Since the RME for residents is a housewife and small children at home all day, the fraction ingested must be 1.0. The Division does not recognize a "matrix effect" for soil ingestion or fruit and vegetable ingestion.

6. Section 5.1.6: The RME for dermal exposure should consider different surface areas for children and adults. Children should include the areas for head, hands, arms, legs, and feet; Adults should consider head, hands, arms, and legs. This is conservative, but accounts for studies that indicate that dermal exposure to soil can occur beneath clothing. In addition, the Division does not recognize an "adherence factor" or "fraction contacted from contaminated source."

If you have any questions regarding these matters, please call Joe Schieffelin of my staff at 692-3356.

Sincerely,



Gary W. Baughman, Chief
Facilities Section
Hazardous Waste Control Program

cc: Richard Schassburger, DOE
Jen Pepe, DOE
Ed Mast, EG&G
Jackie Berardini, CDH-OE